



Name: \_\_\_\_\_ Class: \_\_\_\_\_

## How do mass and velocity affect the kinetic energy of a vehicle?

### Introduction:

In this activity you will be using a dynamics trolley and data logging equipment to generate data to either:

- a. Show how the kinetic energy of the trolley changes with its mass **or**
- b. Show how the kinetic energy of the trolley changes with its velocity.

I am investigating the affect of \_\_\_\_\_ on kinetic energy of the trolley. Once you have gathered your data you will then hand draw a graph, this graph will be graded.

### Experimental Notes

***Please be careful – we have borrowed this equipment from high school!***

Set the light gates 1m apart on the ramp using clamp stands.

Connect the lead from the higher light gate to 1A and the one from the lower light gate to 2B on the data logger.

Place a tray upright at the end of the ramp to catch the trolley as it comes down.

1. Choose a ramp height.
2. Attach an interrupter card to the trolley in the groove of the retractable slot.
3. Position your trolley on the top of the ramp with the interrupter card facing forwards.

Release the trolley for a trial run making sure that the interrupter card goes between the gates on both light gates without collision. Adjust as necessary.

4. Press and hold the **on** button on the data logger. From the display choose, **Timing/Momentum and Kinetic Energy/next/From A to B/next/Enter Parameters/next/Enter Units and Decimal Places/finish**

You should now have a display on the screen for two light gates – red and blue and a blank bar graph.

5. When you are ready to begin the experiment, hold the trolley in position, click the green arrow on the data logger (green to red) and release the trolley.

When you have a set of results you think are reliable, then copy them in to your exercise book. If time allows, then repeat twice more for each condition. (If you do this then you will plot the average of your results on your graph.)

6. Change your ramp height (if your variable is velocity.) Or change the mass by adding extra 250g masses to the trolley. If you change the mass you will need to go back to the home screen on the data logger and re-input the data. If you are changing the velocity (by changing the ramp height) you do not need to do this.
7. Repeat steps 5 and 7 until you have tested five different conditions.